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ATTACHMENT TO L-4233

29 SEPTEMBER 1967

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ELECTRIC POWER GRID SYSTEM
NORTH VIETNAM

(SEE NPIC BRIEFING BOARD L-3225 FOR COMPARISON)

1. SIGNIFICANCE:

THIS BRIEFING BOARD UPDATES THE ELECTRIC POWER GRID SYSTEM OF NORTH VIETNAM AS DEPICTED ON NPIC BRIEFING BOARD L-3225 OF 07 JUNE 1967 AND REVEALS A SIGNIFICANT CHANGE IN THE POWER GRID AND THE POWER FACILITIES WITHIN THAT GRID.

2. BACKGROUND:

CONSTRUCTION OF ELECTRIC POWER FACILITIES IN NORTH VIETNAM WAS BASED ON SOUND ENGINEERING; PLANTS PROVIDING BASELOAD POWER PLANTS WERE ACCESSIBLE TO COAL BASINS AND WERE INTEGRATED WITH OTHER FACILITIES. WHILE THE BASIC ECONOMY DID NOT REQUIRE A LARGE ELECTRIC BASE, PLANNING FOR FUTURE EXPANSION HAD BEEN INCORPORATED INTO ORIGINAL DESIGNS. THE MODERN PRINCIPLES WERE STRONGLY INFLUENCED BY SOVIET PRACTICES. EQUIPMENT FOR THE GENERATING PLANTS AND THE MAIN INTERCONNECTIONS (SUBSTATIONS) WERE BUILT BY THE USSR. COMMUNIST CHINA ALSO CONTRIBUTED SIGNIFICANT AMOUNTS OF EQUIPMENT, AND POLAND, HUNGARY, AND CZECHOSLOVAKIA PROVIDED ADDITIONAL ASSISTANCE. CONSTRUCTION OF POWER PLANTS AND TRANSMISSION LINES WERE CONCENTRATED IN THE PRIMARY CONSUMING AREA IN THE VICINITY OF HA NOI AND HAI PHONG, WHERE APPROXIMATELY 85 PERCENT OF THE ELECTRIC ENERGY WAS UTILIZED. HERE, THREE MAJOR BASELOAD INSTALLATIONS WERE

NGA review(s) completed.

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ESTABLISHED TOGETHER WITH A RATHER EXTENSIVE TRANSMISSION NETWORK. THE PRINCIPAL FACILITIES WERE BUILT AT UONG BI TO SERVE URBAN AREAS; AT THAI NGUYEN TO FURNISH ELECTRICITY TO A NEARBY METALLURGICAL PLANT AS WELL AS TO TRANSMIT ELECTRIC ENERGY TO HA NOI; AND AT VIET TRI TO SUPPLY AN ADJACENT CHEMICAL COMBINE AND ALSO TO LINK THE TRANSMISSION NETWORK. A PRIMARY SUBSTATION NORTH OF HA NOI WAS ESTABLISHED AS THE FOCAL POINT OF THE NETWORK FOR CONTROL OF ELECTRIC POWER TO THE CAPITAL. THE PLANT AT BAC GIANG SERVES AN ADJACENT CHEMICAL FERTILIZER COMBINE AND WAS TO BE TIED TO THE MAIN NETWORK. CONSTRUCTION OF THE LANG CHI HYDROELECTRIC POWER PLANT AT THAC BA HAD BEEN UNDERWAY.¹/

THE ONLY SIGNIFICANT TRANSMISSION NETWORK IN NORTH VIETNAM IS CENTERED ON HA NOI AND INTEGRATES MAJOR POWER PLANTS WHICH CONTAIN APPROXIMATELY THREE-QUARTERS OF THE TOTAL NATIONAL CAPACITY. THE NETWORK IS MAINLY COMPOSED OF SINGLE LINE CONNECTIONS ²/ RADIATING FROM THE CAPITAL AREA AND CONTROLLED BY A SINGLE MAJOR TRANSFORMER AND SWITCHING STATION, DONG ANH, ABOUT TEN KM NORTH OF THE CITY. THIS CONVERGING OF THE FEW IMPORTANT TRANSMISSION LINES SERIOUSLY RESTRICTS THE POSSIBILITY OF ALTERNATE SOURCES OF SUPPLY IN THE EVENT OF EQUIPMENT FAILURE. THE PRIMARY TRANSMISSION FACILITIES CONSIST OF 110-KV LINES AND 35-KV LINES. THE MAJOR OPERATING 110-KV CONNECTIONS ARE FROM THE THAI NGUYEN POWER PLANT AND FROM THE VIET TRI POWER PLANT TO THE HA NOI SUBSTATION, DONG ANH. THIS SUBSTATION IS ALSO

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THE TERMINUS OF A 110-KV LINE, ORIGINATING AT THE UONG BI POWER PLANT, WHICH UNTIL DAMAGED WAS A PRINCIPAL SUPPLIER OF ELECTRICITY TO HA NOI, ACCOUNTING FOR AN ESTIMATED ONE-FOURTH OF THE ELECTRICITY USED IN THE CAPITAL. A 110-KV LINE FROM UONG BI TO HAI PHONG PREVIOUSLY FURNISHED AN ESTIMATED ONE-THIRD OF THAT URBAN AREA'S ELECTRICITY. FROM THE DONG ANH SUBSTATION, A 110-KV LINE TO HA NOI IS THE MAIN MEANS BY WHICH THE CAPITAL IS SUPPLIED WITH ELECTRICITY FROM EXTERNAL SOURCES. A 110-KV LINE ALSO LEADS FROM THE VIET TRI POWER PLANT TO THE SITE OF THE LANG CHI HYDROELECTRIC POWER PLANT, THAC BA.

THE EXTENT OF THE NETWORK AND ITS DESIGN, PRIMARILY TO SERVE HA NOI AND HAI PHONG, HAS REQUIRED THE ERECTION OF A NUMBER OF SUBSTATIONS. TRANSMISSION CONNECTIONS ARE BY OVERHEAD LINES, CARRIED LARGELY BY PRESTRESSED CONCRETE SUPPORTS AND STEEL TOWERS. CONDUCTORS ON RECENTLY BUILT LINES ARE ALUMINUM CABLE, STEEL REINFORCED, WHILE ON OLDER LINES THEY ARE PRINCIPALLY COPPER. DISTRIBUTION SUBSTATIONS IN THE MAIN CITIES PROVIDE 3-PHASE, 50-CYCLE, ALTERNATING CURRENT AT 110 VOLTS FOR DOMESTIC USE AND AT 220 VOLTS FOR INDUSTRIAL AND COMMERCIAL CONSUMPTION.^{3/}

3. COLLATERAL:

THE AIR ATTACKS AGAINST THE ELECTRIC POWER SYSTEM OF NORTH VIETNAM HAVE SIGNIFICANTLY REDUCED THE AMOUNT OF ELECTRIC ENERGY AVAILABLE TO THE SMALL BUT IMPORTANT INDUSTRIAL BASE. AS OF [REDACTED] MORE THAN 25X1

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80 PERCENT OF THE NATIONAL ELECTRIC POWER CAPACITY, ESTIMATED AT 192,000 KILOWATTS, HAD BEEN RENDERED INOPERABLE. SMALL DIESEL GENERATORS, MOSTLY OF LESS THAN 20-KW CAPACITY, HAVE BEEN IMPORTED FROM THE COMMUNIST COUNTRIES TO REPLACE SOME POWER FORMERLY OBTAINED FROM DAMAGED STATIONS. THESE DIESEL UNITS, HOWEVER, HAVE A LIMITED CAPABILITY AND ARE RESTRICTED PRINCIPALLY TO ON-SITE INSTALLATION TO SERVE A SPECIFIC PURPOSE.

MOST OF THE DAMAGED POWER PLANTS PROBABLY COULD BE RESTORED TO PARTIAL OPERATION IN FOUR TO EIGHT MONTHS, BUT COMPLETE RESTORATION PROBABLY WOULD REQUIRE AT LEAST A YEAR. TOTAL RECOVERY OF THE ELECTRIC POWER INDUSTRY WOULD REQUIRE NEW INFUSIONS OF FOREIGN ASSISTANCE -- MAINLY TECHNICIANS, EQUIPMENT, AND MATERIAL. HOWEVER, IN THE PRESENT STATE OF CONFLICT, THERE APPEARS TO BE LITTLE PROSPECT OF REBUILDING DAMAGED POWER PLANTS OR ACQUIRING ENOUGH PORTABLE OR MOBILE UNITS TO FULFILL MORE THAN A SMALL PORTION OF TOTAL ELECTRICITY NEEDS.

VITAL MILITARY FACILITIES, SUCH AS RADAR, SAM SITES, AND COMMUNICATIONS, PREVIOUSLY DRAWING ON POWER PLANTS FOR PRIMARY SUPPLY, NOW MUST DEPEND ALMOST SOLELY ON INTEGRAL DIESEL UNITS. ALTHOUGH THESE ARE CONSIDERED ADEQUATE TO PERFORM THE CURRENT MILITARY MISSION, EXTENDED RELIANCE ON THESE UNITS WOULD PRESENT PROBLEMS: PERIODIC DIESEL-ENGINE MAINTENANCE MUST BE PERFORMED BY COMPETENT TECHNICIANS, AND DIESEL FUEL MUST BE IN ADEQUATE SUPPLY.

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INDUSTRIAL PRODUCTION IS ESTIMATED TO HAVE BEEN REDUCED BY AS MUCH AS 50 PERCENT BY LACK OF ELECTRICITY. PROLONGED OPERATION OF INDUSTRY AT THIS LOWER LEVEL WILL INCREASE IMPORT NEEDS, INCLUDING SUCH COMMODITIES AS CHEMICALS, STRUCTURAL PARTS, CONSTRUCTION MATERIALS, FOOD PRODUCTS, AND CONSUMER GOODS. BECAUSE SOME ITEMS MAY BE IN SHORT SUPPLY OR HAVE DOMESTIC PRIORITY IN COMMUNIST COUNTRIES, NORTH VIETNAM PROBABLY WILL HAVE DIFFICULTY OBTAINING SUFFICIENT QUANTITIES OF THEM.

MANAGERIAL AND ADMINISTRATIVE PROBLEMS WILL BE COMPLICATED CONSIDERABLY IN THE EFFORT TO COPE WITH THE PRESENT SITUATION, AND DISTRIBUTION OF THE AVAILABLE SUPPLY WILL BECOME EXCEEDINGLY MORE COMPLEX. THE LOSS OF ELECTRIC POWER AND THE CONCOMITANT INDUSTRIAL DECLINE WILL ADD SUBSTANTIALLY TO THE GROWING BURDENS OF THE REGIME.^{4/}

4. BRIEFING BOARD READOUT:

THIS BRIEFING BOARD DEPICTS THE HA NOI/HAI PHONG ELECTRIC POWER GRID SYSTEM BY PROBABLE KILOVOLTAGE AND NUMBER OF CIRCUITS, AND INCLUDES SIX MAJOR (110/35 KV) SUBSTATIONS, FORTY MINOR (35 KV) SUBSTATIONS ^{5/}, SEVEN MINOR SUBSTATIONS UNCONFIRMED BY PHOTOGRAPHY, AND TWENTY-FIVE POWER PLANTS (THERMAL, HYDRO, AND DIESEL). THE MAJOR PORTION OF THE GRID SYSTEM HAS BEEN PHOTOGRAPHICALLY CONFIRMED AND IT IS REVEALED TO BE AN EXTENSIVE RATHER THAN A LIMITED SYSTEM AS WAS PREVIOUSLY BELIEVED.

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1/DIA DEFENSE INTELLIGENCE DIGEST, SEPTEMBER 1966, SECRET.

2/A SINGLE LINE CONNECTION USUALLY CONSISTS OF THREE INDIVIDUAL CONDUCTORS.

3/NATIONAL INTELLIGENCE SURVEY 43C, SEC 62P (REV), NORTH VIETNAM - ELECTRIC POWER, JUNE 1966, SECRET.

4/DIA DEFENSE INTELLIGENCE DIGEST, AUGUST 1967, SECRET.

5/SUBSTATIONS OF LESS THAN 35 KV, OF WHICH THERE ARE APPROXIMATELY 450 IN NORTH VIETNAM, ARE NOT DEPICTED ON GRAPHIC.

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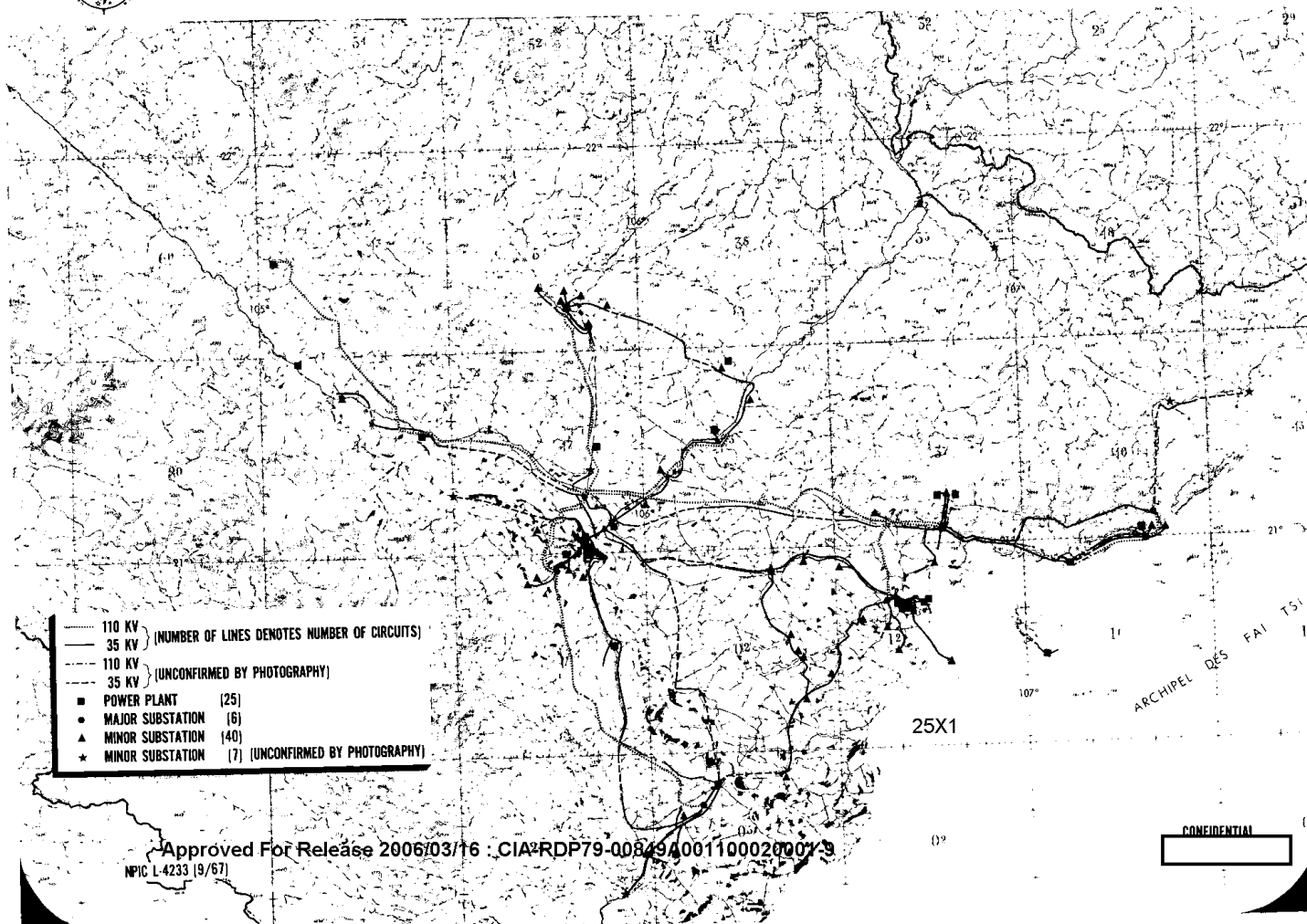
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